2.9. Effect of Porosity and Correlating Permeability and Form Drag to Structure 44
2.10. Friction Factor-Reynolds Number Correlations 47
2.11. Tortuosity and Related Correlations 52
2.12. Minimum Thickness Requirement 53
2.13. Entrance and Exit Regions 59
2.14. Confining Wall and Transverse Size Effects 64
2.15. References 71

3. Numerical Simulation of the Flow through Metallic Foams: Multi-scale Modeling and Experimental Validation 75
J.-F. HÉTU, F. ILINCA, J.-P. MARCOTTE, E. BARIL, L.P. LEFEBVRE and M.D.M. INNOCENTINI
3.1. Introduction 75
3.2. Literature Review 77
3.3. Flow Modeling 79
3.4. Validation: Flow Around an Array of Spheres 82
3.5. Application: Flow Through a Metallic Foam Matrix 85
3.6. Conclusion 95
3.7. References 95

4. Tomography Based Material Model and Simulation of Deformation 97
H.P. DEGISCHER, B. FOROUGHI and A. KOTTAR
4.1. Introduction 97
4.2. Methodology 100
4.3. Deformation Simulations 109
4.4. Applications 120
4.5. Conclusions 125
4.6. Acknowledgements 126
4.7. References 127

5. Yield/Failure Criteria, Constitutive Models, and Crashworthiness Applications of Metal Foams 131
SHARIF SHAHBEYK
5.1. Introduction 131
5.2. Conventional Plasticity Models 132
5.3. Some Alternative Approaches 180

5.4. Application to Structural Crashworthiness 186
5.5. Summary 206
5.6. Reference 207

6. Heat Transfer in Metal Foams 217
AKIRA NAKAYAMA
6.1. Introduction 217
6.2. Volume Averaging and Macroscopic Energy Equations 220
6.3. Stagnant Thermal Conductivity 224
6.4. Stagnant Thermal Conductivity of Metal Foams 232
6.5. Interstitial Heat Transfer Coefficients 238
6.6. Thermal Dispersion 254
6.7. Solutions to the Two Energy Equation Model 262
6.8. Nomenclature 280
6.9. References 281

7. Acoustic Properties and Applications 285
CAMILLE PERROT, FABIEN CHEVILLOTTE, LUC JAQUEN and MINH TAN HOANG
7.1. Introduction 285
7.2. Principles of Acoustical Energy Dissipation Through Metallic Foams 290
7.3. Micro-Macro Simulation Method 294
7.4. Results and Discussion 305
7.5. Further Remarks on the Evaluation of Acoustic Properties of Metal Foams 311
7.6. References 311

8. Porous Metals and Metallic Foams in Orthopedic Applications 317
L.P. LEFEBVRE
8.1. Introduction 317
8.2. Materials and Processes 319
8.3. Composition 322
8.4. Structure 329
8.5. Mechanical Properties 332
8.6. Corrosion 343
8.7. Animal Studies 344